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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,274	04/04/2001	Joseph C. Olson	V0077/7154	2953

7590 12/15/2006

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EXAMINER	
DONG, DALEI	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/826,274	OLSON ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 17-25* is/are rejected.

7)☒ Claim(s) *15 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 23, 2006 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6, 8-14 and 17-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,356,026 to Murto in view of U.S. Patent No. 5,144,143 to Raspagliesi.

Regarding to claim 1, Murto discloses in Figures 5 and 6, a cathode sub-assembly for an ion source comprising: an indirectly heated cathode (72 or 80) having an outer periphery and an interior area; and a support rod (72s or 80s) fixedly attached to the indirectly heated cathode (72 or 80) for supporting the cathode within an arc chamber

(64) of the ion source and avoiding gas introduction and high pressure near the support rod (72s or 80s), the indirectly heated cathode (72 or 80) configured to emit electrons within the arc chamber that collide with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21).

However, Murto does not disclose the support rod is fixedly attached to the interior area of the cathode.

Raspagliesi teaches in Figure 1, a cathode sub-assembly for an ion source comprising: the support rod (23) fixedly attached to the interior area of the cathode (24) for the purpose of achieving a high melting point for the ionization of the metals.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize construct the support of Murto at the interior area of the cathode according to Raspagliesi in order to achieve a high melting point for the ionization of the metals.

Regarding to claim 2, Murto discloses in Figures 5 and 6, the support rod (72s or 80s) is attached to a surface of the cathode (72 or 80) facing away from the arc chamber (64).

Regarding to claim 3, Murto discloses in Figures 5 and 6, the cathode (72 or 80) is in the shape of the disk.

Regarding to claim 4, Raspagliesi teaches in Figures 1 and 3, the support rod (23) is fixedly attached at or near the center of the cathode (24), along the axis of the cathode (24) and the motivation to combine is the same as above.

Regarding to claim 5, Murto discloses in Figures 5 and 6, the support rod (72s or 80s) is in the shape of a cylinder and the diameter of the cathode (72 or 80) is larger than the diameter of the support rod (72s or 80s).

Regarding to claim 6, neither Murto nor Raspagliesi discloses the diameter of the cathode is at least four times larger than the diameter of the support rod. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have adjust the diameter of the support rod in accordance to the cathode, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Regarding to claim 8, Murto discloses in Figures 5 and 6, the support rod (72s or 80s) mechanically supports and conducts electrical energy to the cathode (72 or 80).

Regarding to claim 9, Murto discloses in Figures 5 and 6, a cathode sub-assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (64) that defines an arc chamber (64i), comprising: a cathode sub-assembly, including a cathode (72 or 80) having an outer periphery and an interior area and a support rod (72s

or 80s) fixedly mounted thereto; a filament (70ptl) for emitting electrons, that is positioned outside the arc chamber (64i) in close proximity to the support rod (72s or 80s) of the cathode sub-assembly, the cathode (72 or 80) configured to emit electrons within the arc chamber that collide with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21).

However, Murto does not disclose the support rod is mounted to the interior area of the cathode and the cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing, that is disposed around the cathode of the cathode sub-assembly.

Raspagliesi teaches in Figures 1 and 3, a cathode sub-assembly comprising: a support rod (23) fixedly mounted to the interior area of the cathode (24) and a cathode insulator (16) for electrically and thermally isolating the cathode (24) from an arc chamber housing (15), that is disposed around the cathode (24) of the cathode sub-assembly for the purpose of insulating the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the cathode configuration and cathode insulator of Raspagliesi for the cathode sub-assembly of Murto in order to insulate the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Regarding to claim 10, Murto discloses in Figures 5 and 6, a filament (70ptl or 78 ptl) disposed around the support rod (72s or 80s) in close proximity to the cathode (72 or 80) and isolated from the plasma in the arc chamber (64i).

Regarding to claim 11, Murto discloses in Figures 5 and 6, a filament (70ptl or 78ptl) disposed around the support rod (72s or 80s) in close proximity to the cathode (70 or 80) and isolated from a plasma in the arc chamber (64i), wherein the filament (70ptl or 78ptl) is fabricated of an electrically conductive material and includes an arc-shape turn having an inside diameter greater than or equal to the diameter of the support rod (72s or 80s).

Regarding to claim 12, Murto discloses in Figures 5 and 6, a cathode sub-assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (64) that defines an arc chamber (64i), comprising: a cathode sub-assembly, including a cathode (72 or 80) having an outer periphery and an interior area and a support rod (72s or 80s) fixedly mounted thereto, the cathode (72 or 80) configured to emit electrons within the arc chamber that collide with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21); a filament (70ptl) for emitting electrons, that is positioned outside the arc chamber (64i) in close proximity to the support rod (72s or 80s) of the cathode sub-assembly; and a filament (72ptl or 78ptl) disposed around the support rod (72s or 80s) in close proximity to the cathode (70 or 80) and isolated from a plasma in the arc chamber (64i), wherein the filament (72ptl or

78ptl) is fabricated of an electrically conductive material and includes an arc-shaped turn having an inside diameter greater than or equal to the diameter of the support rod (72s or 80s), and wherein a cross-sectional area of the filament varies along a length of the filament (at the two ends of the filament), and is smallest along the arc-shaped turn.

However, Murto does not disclose the support rod is fixedly mounted to the interior area of the cathode and the cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing, that is disposed around the cathode of the cathode sub-assembly.

Raspagliesi teaches in Figures 1 and 3, a cathode sub-assembly comprising: a support rod (23) fixedly mounted to the interior area of the cathode (24) and the cathode insulator (16) for electrically and thermally isolating the cathode (24) from an arc chamber housing (15), that is disposed around the cathode (24) of the cathode sub-assembly for the purpose of insulating the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the cathode insulator of Raspagliesi for the cathode sub-assembly of Murto in order to insulate the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Regarding to claim 13, Murto discloses in Figures 5 and 6, a cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (64) that defines an arc chamber (64i), comprising: a cathode sub-assembly, including a

cathode (72 or 80) having an outer periphery and an interior area and a support rod (72s or 80s) fixedly mounted thereto, the cathode (72 or 80) configured to emit electrons within the arc chamber that collide with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21); a filament (70ptl or 78ptl) for emitting electrons, that is positioned outside the arc chamber (64i) in close proximity to the support rod (72s or 80s) of the cathode sub-assembly.

However, Murto does not disclose the support rod is fixedly mounted to the interior area of the cathode and the cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing, that is disposed around the cathode of the cathode sub-assembly; wherein said cathode insulator includes an opening having a diameter that is larger than or equal to the diameter of the cathode.

Raspagliesi teaches in Figures 1 and 3, a cathode sub-assembly comprising: a support rod (23) fixedly mounted to the interior area of the cathode (24)a cathode insulator (16) for electrically and thermally isolating the cathode (24) from an arc chamber housing (15), that is disposed around the cathode (24) of the cathode sub-assembly; wherein the cathode insulator (16) includes an opening having a diameter that is larger than or equal to the diameter of the cathode (24) for the purpose of insulating the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the cathode insulator of Raspagliesi for the cathode sub-assembly of Murto in order to insulate the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Regarding to claim 14, Murto discloses in Figures 5 and 6, a vacuum gap is provided between the cathode insulator and the cathode to limit thermal conduction.

Regarding to claim 17, Murto discloses in Figures 5 and 6, a method for supporting and indirectly heating a cathode of an ion source comprising: bombarding the cathode (70 and 80) with electrons from a filament (70ptl and 78ptl) positioned outside an arc chamber (64i) of the ion source for heating the cathode (70 and 80); and emitting electrons from the cathode (72 or 80) for collision with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21).

However, Murto does not teach supporting the cathode by a rod fixedly attached to the interior area of the cathode.

Raspagliesi discloses in Figures 1 and 3, a method of supporting and indirectly heating a cathode (24) of an ion source comprising steps of supporting the cathode (24) having an outer periphery and an interior area by a rod (23) fixedly attached to the interior area of the cathode (24 which avoids gas introduction and high pressure near the rod (by the inlet line 19); for the purpose of insulating the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the cathode support of Raspagliesi for the cathode sub-assembly of Murto in order to insulate the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Regarding to claim 18, Murto discloses in Figures 5 and 6, a cathode assembly for an ion source comprising: a cathode (72 or 80) having an outer periphery and an interior area; a support rod (72s or 80s) fixedly attached to the cathode (72 or 80) which avoids gas introduction and high pressure near the support rod (72s or 80s); and an indirect heating device (38) for indirectly heating the cathode; wherein the cathode is configured to emit electron with an arc chamber (64i) of the ion source that collide with gas molecules within the arc chamber to produce ions for implantation in response to the heating of the cathode (see column 8, lines 11-22).

However, Murto does not disclose the support rod is fixedly mounted to the interior area of the cathode and the cathode insulator for electrically and thermally isolating the cathode from an arc chamber housing.

Raspagliesi teaches in Figures 1 and 3, a cathode sub-assembly comprising: a support rod (23) fixedly mounted to the interior area of the cathode (24) and the cathode insulator (16) for electrically and thermally isolating the cathode (24) from an arc chamber housing (15) for the purpose of insulating the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the cathode insulator of Raspagliesi for the cathode sub-assembly of Murto in order to insulate the cathode from arc discharge chamber to maintain a efficient emissions of electrons.

Regarding to claims 19-24, the limitation of the support rod is press fitted into the cathode is a method of forming the device please note that the claimed method steps are product by process limitations. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore, it is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an obvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Regarding to claim 25, Murto discloses in Figures 5 and 6, a cathode sub-assembly for an ion source comprising: an indirectly heated cathode (72 or 80) having an outer periphery and an interior area, the indirectly heated cathode (72 or 80) configured to emit electrons within the arc chamber that collide with gas molecules within the arc chamber to produce ions for implantation (see column 8, lines 11-21); and a support rod (72s or 80s) fixedly attached to the indirectly heated cathode (72 or 80) for supporting the cathode within an arc chamber (64) of the ion source and avoiding gas introduction and high pressure near the support rod (72s or 80s).

The limitation of the support rod is press fitted into the cathode is a method of forming the device please note that the claimed method steps are product by process limitations. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore, it is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an obvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

However, Murto does not disclose the support rod is fixedly attached to the interior area of the cathode.

Raspagliesi teaches in Figure 1, a cathode sub-assembly for an ion source comprising: the support rod (23) fixedly attached to the interior area of the cathode (24) for the purpose of achieving a high melting point for the ionization of the metals.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize construct the support of Murto at the interior area of the cathode according to Raspagliesi in order to achieve a high melting point for the ionization of the metals.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,356,026 in view of U.S. Patent No. 5,144,143 to Raspagliesi and in further view of U.S. Patent No. 4,783,595 to Seidl.

Regarding to claim 7, Murto in view of Rasapagliesi discloses the claimed invention except a spring-loaded clamp for holding the support rod.

Seidl teaches in Figure 1, column 8, lines 28-55, a cathode sub-assembly comprising: a spring loaded clamp (7) for holding the support rod for the purpose of exerting compression force to keep cathode tightly fixed within the plasma chamber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the spring loaded clamp of Seidl and center support of Rasapagliesifor for the cathode sub-assembly of Morimiya in order to exert an compression force to keep the cathode tightly fixed within the recess and further provided improved and reliable electrical contact.

Allowable Subject Matter

7. Claims 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record taken alone or in combination fails to teach or suggest cathode insulator includes a flange.

Response to Arguments

8. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.
December 6, 2006

Dalei Dong
Patent Examiner
Art Unit 2879